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# **IMPACTS OF EGYPTIAN SOCIO-ECONOMIC ENVIRONMENT ON DIETARY PATTERN AND ADEQUACY**

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## **ABSTRACT**

Health and nutrition status including dietary adequacy are basic components of the human development and indicators for welfare in a certain community. The study focused upon how far the socio-economic environment would affect the dietary pattern and adequacy in Egypt. The current dietary pattern was compared with that before the economic reform adjustment, i.e. before 1986. Dietary adequacy of energy and protein was assessed to define the poverty line among urban and rural populations. The investigated changes in the socio-economic environment were income level, distribution, growth and price level by region; as well as demographic features of the household. Finally, the study discussed policy implications on both micro and macro level and provided recommendations to the decision-makers for how to secure adequate diet quantity-wise as well as quality-wise for poor categories and vulnerable groups among the Egyptian community.

## **INTRODUCTION**

Sustainable development entails making full use of human resources by improving education and health services and by combating hunger. It is especially important, that to sustain development, basic needs should reach those living in extreme poverty. Human development also interacts strongly with other dimensions of sustainable development. A population healthy, well fed-enough to work and of a better educated work force, stimulate and sustain economic development- However, adequate diet in both quantity and quality is the primary base to gain the fruits of education, training and cultured diversity. The newly industrializing countries -Asian Tigers- made remarkable economic progress by using their human resources to bow out of poverty.

While economic growth is a critical component of human development, it does not capture the broader picture of human welfare, lack of reasonable pattern of income distribution can adversely affect overall human welfare. Improvements in human development through well structured social spending are vitally needed, even in the absence of rapid economic growth or equitable income distribution. Therefore, the targeted government intervention should be promoted and oriented to maintain human development during the transitional period of structural economic reform.

The term malnutrition is used to refer to the physical effects on human body due to inadequate quantity and/or quality of dietary intake. In addition, the high prevalence of infection in developing nations excavates malnutrition by decreasing nutrient utilization and enhancing disease susceptibility [1]. However, malnutrition also embraces "over nutrition" contributing to several diseases that also, negatively, affect the human productivity and potentiality, such as obesity, diabetes and heart diseases, but that is a problem associated with affluence of rich classes with poor awareness, rather than poverty of real poor classes.

A number of international conferences and several recent publications have contributed to the belief that malnutrition and ill health are widespread manifestations of poverty and at the same time obstacles to human resource development, consequently, are obstacles to

national development. Also, the difficulty of raising the miserably low returns to labor and of reducing inequalities in distribution of incomes accentuates the problem of poverty [2].

In Developing countries, the majority of the population is within the categories vulnerable to nutrition. Those are infants, young children; and pregnant and lactating women. The UNICEF survey in 1990 suggested that more than one third of the developing world's children under 5 years of age (excluding China), are malnourished. Of these 150 million children, at least one in six millions is severely malnourished. Malnutrition shows up quickly in young children, acting as early warning sign of distress, ill health and anemia. The appearance of malnutrition in young children is believed to reflect the health and nutritional situation of all members of the population. Malnutrition can lower a child's immunity, making the child more susceptible to diseases [3&4]. This in turn reduce aptitudes, cause nutrient loss, inhibit absorption, and alter the body's metabolic, thereby resulting in inadequate dietary intake and further malnutrition. This vicious cycle of malnutrition and infection has been termed the "most prevalent public health problem in the world today" [4]

On the other hand, the establishment of food and nutrition policy, usually, requires formulation of objectives for desirable changes in the diet of the population. This in turn requires clear and accurate pictures of the population's dietary pattern and diet-related health (or disease) pattern, which are needed to indicate where changes ought to take place.

Data on dietary pattern of populations can be obtained from many sources i.e., food balance sheet (FBS), household budget surveys (HBS) and individual level studies as well as mortality statistics. While long term planning for expansion of the food availability is usually based upon FBS national average figures for projected nutritional food demands, the data does not reflect the income distribution pattern. Also, FBS data, in many countries is lacking of reasonable accuracy in estimating production, losses, and non-human use of food items, such as animal consumption of grains and legumes.

Therefore, in many developing countries the results from regular HBS are an important addition to FBS data, because they show the distribution of food in subgroups of households. Food policy is receiving more serious attention in Egypt than ever before, particularly during the economic reform adjustment period, that has started since 1986. It was postulated that removing food price subsidies and increasing food prices by application of free market policy would create a dramatic changes on economic and social behavior of the population which in turn affect their food consumption pattern and consequently their nutrition pattern and adequacy [5,6,7 &8] Nutrition target surveys can be conducted on reasonable accurate base, as those done occasionally over the period 1976 up to 1987 [9], but they provide average consumption at either national level or for limited categories of the population. However, HBS, even though it is published every ten years by Central Agency for Public Mobilization and Statistics (CAPMAS). It provides extensive and representing samples for all population categories.

The most recent HBS is published in December 1993 for a survey conducted 1990/1991 [10]. Therefore, appraisal of the dietary pattern in Egypt, using the available HBS of 1990.91, would be a vital guide to all who are concerned with people's nutritional well-being as a social goal of development. Consequently, the objectives of this study are: to appraise the current dietary pattern and assessment of dietary adequacy of both energy and protein, before and after the application of free market and finally to assess the poverty line parameters through investigating the socio-economic changes over time. Such changes include income growth,

income distribution, and price level, regional differential and demographic features of the household

## **DATA BASE**

Household Budget Survey HBS data of 1990/1991 published by Central Agency for Public Mobilization and Statistics CAPMAS [10] were used. The Survey was conducted by CAPMAS to include data from 15000 households (82109 individuals) from Egypt urban and rural areas at a ratio of 3:2. Data collection based on a rotating sample of 1250 households sampled each month. Data were collected by personal interviews coupled with the maintenance of diary record for one month. The quantities of and expenditure on individual types of food were recorded (251 items), as purchased and/or home produced. The survey covered the period from September 1990 to August 1991.

## **METHODOLOGY**

### ***Estimation of food consumption quantities***

The collected data on food were extensive enough to cover in detail all types of food items (251). However, the published data aggregate some groups as either quantity and/or value terms. While food consumption data of HBS are tabulated along 14 income classes, in terms of quantity and values per household per year for major food commodities, some other food items are reported only in terms of expenditure value. On the other hand, some food groups are reported as an aggregate total expenditure value on each group, such as legumes, vegetables and fruits. Therefore, the average daily per capita purchased quantities were estimated as major food items.

The recorded quantities for 31 major food items were estimated as total of home produced and purchased quantity per capita consumption per year without modification. These included wheat grain, wheat flour, macaroni, rice and maize (cereals); faba beans and lentil (legumes), tomatoes, potatoes, onion, garlic, date and citrus fruits (vegetables and fruits); red meat fresh and frozen, poultry, eggs, fresh fish, milk, white cheese, cottage cheese "karish cheese", butter and ghee (animal products); ration quota and free-market sugar quantities, honey, molasses and "halawah" (Sugar food items); ration quota and free-market quantities of oils. Food items recorded in terms of expenditure values. These are 14 food items, which are (squash, okra, banana, grapes, melons and water melons; fish frozen and canned, milk dry, milk pasteurized; hard cheese; hydrogenated oils; carbonated beverages, and alcoholic beverages; ready to eat food "sandwiches" and eat-out meals in restaurant, etc.). Purchased quantity of each item was derived by dividing the monetary expenditure by the corresponding average survey price, derived from (Monthly Bulletin for consumer price, published by CAPMAS), except expenditure on bread and eating out items, which were treated differently. In case of bread, monetary expenditure was divided by the price of loaf (Baladi bread) and multiplied by the loaf weight. Also in case of ready to eat food (sandwiches) it is assumed that 25% of expenditure value accounted for bread and 25% for legumes, particularly "faba bean cooked as "foul medames" and "taamaya". Moreover, bread eaten outside home accounted for 10% of total expenditure value of restaurants meals and vendor foods. The purchased quantities of the aggregate expenditure on some food groups were estimated for legumes; fruits; vegetables; and sugars by subtracting the expenditure values on the individually, recorded food items from the aggregate recorded expenditure on the corresponding food group. Then the value was divided by an estimated average weighted price for the food group to get the consumed quantities.

### ***Estimation of energy and protein intake***

The average daily per capita purchased quantity of each food item was used to calculate the energy and protein intake, considering the edible portion for each food item and the energy and protein contents using Food Composition Tables (11). The total energy intake was expressed in Kcal/capita/day, and protein as gross protein in gram/capita/day. Data were tabulated by region (urban and rural) as well as by annual household income class (the original 14 classes were aggregated as seven annual household expenditure classes).

### ***Estimation of energy and protein requirements:***

Daily per capita energy and protein requirements were estimated for each income class among urban and rural population samples. The population structure by age and sex group for each income class was: less than 1 yr children; 1-4yr children; 5-9yr boys & girls; 10-19yr boys & girls; 20-39 yr male, & female; 40-59 yr male, female; and 60yr and above of male and female. The daily energy and protein requirements per person by sex and age group of moderate activity are adopted from estimates set in 1985 by WHO (12). The weighted daily per capita requirement for energy was estimated in terms of Kcal. Protein requirement (as reference protein) was adjusted for the protein quality (60%) of Egyptian diet.

### ***Dietary Adequacy***

Quantitative adequacy of the diet indicated by the capability of the diet to satisfy energy and protein needs was estimated for each income class as percent intake to the corresponding estimated requirements. The following scale was used to classify diet adequacy: (a) Over intake of diet denotes a ratio > 110%. (b) Adequate diet denotes a ratio > 90% to 110%; (c) Minor to moderate inadequate dietary intake denotes a ratio 90% to 60%; (d) Sever inadequate intake denotes a ratio < 60%. The poverty line is defined in this study for both urban and rural regions as the critical income class that the household below such levels receiving inadequate diet, i.e., 90% or less of energy and protein requirements. Socio-Economic Factors Affecting Dietary Adequacy

The study investigated the impacts of the demographic region (urban versus rural) and income level on the dietary adequacy. Income distribution pattern was assessed by drawing the Lorenz Curve and magnitude of the distribution (estimation of the Gini Coefficient).

To investigate the impacts of structural changes on the dietary profile in Egypt, the dietary profile and adequacy estimated from the 1991 HBS was compared with a similar study applied for the HBS of 1975. In the seventies the government intervention in the market and the food price subsidy was extremely high, while in 1991 the economic liberalization policies of the market were effectively applied. Economic growth and price inflation rate between the two periods were also compared to show the impacts of economic growth on dietary profile.

## **RESULTS AND DISCUSSION**

### ***Regional Differences and Dietary Pattern***

The remarkable definition of dietary pattern in this study denotes the relative share of energy and protein supplied by food items (or an aggregate food group) in the total intake. This section presents the impact of regions and income levels (total annual household expenditure) on the current dietary pattern based on the most recent data of Household Budget Survey 1990/91.

Table 1 presents the dietary pattern (energy and protein) by region, as well as, the national average. Cereal is the main energy source of Egyptian diet. It accounts for 62% of total energy intake (2230 Kcal/capita/day). Among cereal group, wheat (including bread and wheat preparations) is the major item (about 46% of energy intake), followed by rice (11 %). Oils and fats and sugar foods supply 10% of energy intake per each. Animal protein products and

Vegetable and fruits provide .approximate, 7% per each. The least proportion (4%) is supplied by legumes.

The level of energy intake in urban is slightly higher than rural being 2269 and 2183 Kcal/capita/day, respectively. However, energy pattern is varied. Urban people consume less of aggregate cereals and legumes and more of other (superior) food groups than rural. Even though, both regions rely on wheat, urban consumers have more wheat than rural, while maize and rice has significant contribution in rural pattern than urban. This is because maize is being mixed with wheat for bread making in rural, while bread in urban is entirely made from wheat flour. Moreover, rice supplies more of energy in rural diet (about 14%) than urban (8.4%), which might due to its availability in rural areas at cost of production price from home produced. On the other hand, the share of superior food groups in urban pattern, surpasses such share in rural pattern might be a reflection of the higher income level in urban, than rural.

Protein dietary pattern indicates that almost 80% of protein intake comes from vegetal sources, and the total gross protein intake on national level reaches 67.2 gm/capita/day. Animal sources contribute more to total protein intake in urban than rural (22.1 % vs. 17.6%). High price of animal products and low income level in rural are the main reasons for such difference, as will be shown in the successive sections.

### ***Impacts of Income Level on Dietary Pattern***

With respect to income effect on dietary pattern, Table 2 shows the difference in energy and protein pattern among three income classes in both urban and rural regions. Income has a significant impact on dietary pattern, particularly on cereals, animal products as well as fats. Cereal share in the daily diet for both energy and protein has decreased as income increased. Cereal foods provide the relatively cheap source of energy and protein for low income people. However, as income increases people tend to shift to more expensive energy sources (sugar & fats) and better quality of protein (animal products).

This phenomenon is clearly shown among urban categories of relatively high income level than in rural categories. The decline in cereal share, associated with higher income level, is more pronounced in urban than rural, being for energy 11% and 8%, respectively, while the corresponding decrease values for protein are 15% and 10%. On the other hand, a progressive increase in the share of animal, products (including milk fats) in dietary pattern is strongly associated with income, where its share is almost doubled in high income levels than low ones.

Since 1986 Egypt has moved .dramatically, towards economic liberalization and free market economy. It was anticipated that economic policy changes and reform would affect the dietary pattern, as social externalities of such changes. Comparison was made between the current dietary patterns HBS 1991 to what was in the last two decades, i.e., HBS 1974/75 dietary pattern (5) is presented in table 3.

The average national per capita intake of energy decreased from 2728 Kcal in 1975 to 2230 Kcal in 1991. It was mainly due to a significant decrease in cereal foods, where cereals share in the daily diet decreased from 75.2% to 62%. Food subsidies during the 70's represented an extremely sizable share of various subsidy types, and focused heavily on grains, particularly wheat and flour as a staple food in Egypt (13). However, due to changes in economic performance adopted since 80's, subsidy of wheat had decreased from 73% of the total subsidy in 1973 to 11% in 1989 (14). On the other hand the shares of most other food groups have increased in 1991 than 1995. The apparent impacts of such changes are health -wise and economic wise favorable to the Egyptian economy, but it was associated with an increase in consumption of sugar. The share of sugar in the average per capita daily energy pattern

increased from 5.5% in 1975 to 9.8% in 1991. High sugar consumption is strongly related to the so called diet related non-communicable diseases, and add burden on the annual importation budget of Egypt, where subsidy for sugar and edible oils have increased over the concerned period (14).

The decrease in daily energy intake also associated with a decrease in gross protein daily intake from 75.7 gm in 1975 to 67.2 gm in 1991, because most of the protein sources are from vegetal sources, which are mainly cereals.

Even though, a significant increase occurred in animal protein intake over the concerned period, the average intake from animal sources was 11 gm (14.5% of gross protein) in 1975 and raised to 13.5 gm (20.1% of gross protein) in 1991. Not only had that, but the legumes share in the diet (in terms of energy) increased from 2.8% to 3.9% in the 1975 and 1991, respectively. Heavy importation trend (about 40% of supply) as frozen red meat with export price subsidy policy from E.G. common market to reach Egyptian at one-half the local red meat price, and the free market allowances for the private sector to import all food items at low custom tariffs behind such stream of imported red meat. It was also because the strong growth in poultry production, either as broiler meat or as table eggs (15).

Therefore, on the national level, except the two folds increase in sugar consumption, which is unhealthy performance and reflects uneconomic performance, the changes in food consumption pattern were socially and economically rational.

#### ***Dietary Adequacy and Impacts of Demographic Region and Income Level***

The social concept of food security and its relation to human resource development implies to secure the daily diet requirements, not only on the national average but it is more important to exist among all regions as well as income classes (16).

The average daily per capita intake of energy and protein were estimated among the household annual income classes (income is expressed as annual household expenditure) for urban and rural regions to evaluate dietary adequacy (Table 4 for Urban and Rural). The average daily intake from energy and protein in urban is slightly higher than rural, but in both regions intake increases significantly as income level increases. However, the trend of increase along income classes is of higher magnitude in rural. On the average the intake for the highest income class in rural is 4.8 times that for the lowest income class while the comparable ratio in urban is only 1.7.

The daily energy requirement estimates for different income classes of population samples range from 2140 to 2370 Kcal/capita. Variation of per capita energy requirements is mainly due to demographic structure (age and gender categories) within each class. With respect to protein requirement it\* ranges between 62.5 and 78.6 gm/capita/day, as gross protein, considering a 60% protein quality. Meanwhile, Protein/Energy ratio (P: E) of these requirement estimates gave a value of 10% which is reasonable for a predominantly vegetable protein diet as in case of developing countries (17).

Quantitative adequacy of the diet is investigated as defined in section (3.4.) of this study. The region average daily energy and protein intake in urban (Table 4) seems be adequate. However, among income classes, about 6% of the urban population (around 1.8 millions), up to household income class less than I.E. 2400/yr shows minor to moderate inadequate diet for both energy and protein. This category of the population acquires an average per capita income less than LE 670 i.e. less than 63%, of the average annual income in urban. They spend from 66% to not less than 57% of their income on food only. This level of income can represent the minimum identification of poverty line in urban "L.E.56/capita/month". On the other hand, over-intake from energy and

protein was detected from table 4 as between 17% to 35% among almost, one-fifth of the urban population, at annual household income of L.E.8000 and above. This category acquires 149% up to 280% of the average per capita income level in urban and their expenditure on food ranges between 46.4% to only 35.5% of the income.

With respect to rural regions, (table 4), the region average of energy and protein intake appears to be adequate, but among income classes a large proportion of the rural population showed inadequate diet. Poverty line is identified at household income level of less than L.E. 4000/yr. i.e. L.E. 699 per capita/yr, which provides about L.E. 58/capita/month. Such income level is not far from the rural average income (99% of the average). These categories spend more than 61% of their income on food. Among them about 2% of the rural population of the least income classes have severe inadequate diet intake, while minor-moderate inadequate diet was prevalent among 42% of the rural population. However, recognized surplus above the requirements were observed (20% to 60% of energy and 13% to 52% of protein) among the richest 29% of the rural population. Whereas those rich classes in rural regions acquire 129% to 268% of the average annual income level they allocated from 58.6% to 48.5% of their income to food.

The analysis showed that the poorest 6% of urban population and 44% of rural population having inadequate energy and protein in their daily diets, which is mainly due to lack of purchase power. This is because such proportion of the population in both regions includes households with annual per capita income (expenditure) of less than 63% of the urban average and .99% of the rural average. It seems that the main reason behind such deficit is mainly the low income level. The socio-economic factors that magnify the differences in income level and then diet inadequacy between poor in both regions were deducted from Table 5. It shows that the average household size in rural was larger than in urban (6.6 persons Vs. 5.2 persons) and the number of the household members that earn living was 1.6 persons in urban and 1.5 persons in rural. Therefore, due to larger household size and less family members that acquire regular income, the sponsorship ratio was one person sponsors 4.4 persons in rural and 3.2 persons in urban. It seems that the relatively cheaper diet price level in rural (protein price in rural was 88.5% of that level in urban and energy price level in rural was 79.6% of that level in urban) has not compensated the larger poverty level in rural region. Then, the rural communities have poorer diet and nutrition status, than urban. It seems that poverty is more apparent in rural regions than urban because the poverty line in the rural is almost equal to the average per capita income in rural, while the poverty line in the urban is only 63% of the regional average income level.

#### ***Dietary Adequacy and vulnerable groups:***

Moreover, the percentage of children less than 10 years (which includes the most vulnerable group) is higher in rural regions (30%) than in urban (23.5%), as estimated from the HBS of 1990/1991. This is an important factor that should be considered, because there are evidences to show that 53.8% and 31.5% of children and their families do not satisfy RDA of energy and protein, respectively, and this group suffering poverty (18).

Meanwhile, the traditional diet is frequently so bulky that children have difficulty in eating enough of it to meet fully either caloric or protein needs (19). The basic fact is that protein-calories malnutrition is widespread problems which adversely affect the quality of life of many individuals over the world and often impair their ability to learn and to work productively.

#### ***Poor Behavior and Price Policy:***

On the other hand, it could be postulated that the food prices are less in rural market than urban market. The cost of food calories in urban was 1.22 times its cost in rural and the price for



purchasing protein in urban was 1.1 times its price in rural regions (table 5), which is not considerable difference. It seems that food prices are almost the same in both regions. However, the recent increase in food prices might have per capita cut backs in quantities of many food items consumed by household, especially the lowest income category of household who are already spending about two-thirds of the income on food. Moor, (7) showed that the majority of households have been decreasing their food consumption while the rest shift for substitutes. This study (table 6) showed that the average annual growth rate in income over the period 1975 to 1991 was around 1 %

The rural people tried to tune their income with the food prices by making substitution. They consume more cereals and legumes than urban people at the expenses of other more superior, more expensive food items, i.e. animal protein, vegetables and fruits, as well as sugar. They also spent higher proportion of their income (60%) to purchase food than in urban (50%). However, the level of food consumption and dietary adequacy in rural communities were less than urban.

#### ***Income Distribution Pattern and Trend:***

Long term planning for expansion of the food availability is, usually, based upon the national average figures for projected national food demand, which does not reflect the income distribution pattern.

The significant difference between income categories and between poor and rich with respect to food availability and adequacy, dictate to analyze the income distribution pattern and equity in 1991 and its trend over the last three decades. The data of the two HBS in 1975 and 1991 conducted by CAPMAS were used to draw the Lorenz curve (table 7) and to estimate the "Gini Coefficient" of income distribution inequality (table 8). The Lorenz curve curvature (figures 1 and 2) in both urban and rural showed that in 1991 the income distribution moved towards more equality than its pattern in 1975. In quantitative term, the "Gini coefficient" as a measure of income distribution equality was estimated as 75.15% in rural in 1991 while it was 65.53% in 1975. In urban region it was 64.31% in 1975 and rose to 74.58% in 1991. However, as presented in earlier section (4.3), the trend towards more income distribution has not shown better diet adequacy for poor categories of the population in 1991 than 1975, either in urban or in rural. This is because the increase in price level consumed the increase in the nominal disposable income of the poor, if any, which was basically low.

## **POLICY IMPLICATIONS AND RECOMMENDATIONS**

Increasing the availability of food does not, spontaneously, result in nutrition improvement for all income groups, poor households may spend a large part of their income, if not all in some cases, on food, yet be unable to afford a nutritionally adequate diet. Then a policy aimed at reducing the food gap may require more than a simple increase in agricultural production.

### ***Economic Growth and Overcome of Malnutrition***

The increase in real per-caput income is the net measure of economic growth. Now the question is: Will the malnutrition problem be solved by strong steady real economic growth? The answer is that the households can do so, if they receive enough income to afford adequate diet as quantity and quality. However, economic development, though it offers, indeed, an effective long run approaches to the solution of the malnutrition. There are substantial numbers in the vulnerable groups who will not receive sufficient incomes in the near future. Waiting a generation or two for economic development to draw away malnutrition, it means acceptance of continued malnourished children. They are the future adults, upon whom economic and social development depends.

Economic Development, Food adequacy and Welfare The household welfare is not only determined by the level and quality of daily diet, but also includes health, education and cultural requirements. However the food is a subsistence demand., therefore, continuous increase in food prices without associated economic growth (real increase in income), it is clear that the household will cut a significant portion of the nonfood expenditure to compensate partially the expected shortage in the budget available for food. The nonfood expenditure includes the other vital components for welfare and human resource development. These are education, health care, housing, cultural activities and other livelihood requirements. To show the magnitude of such income-substitution effect, the required real increase in per capita income has to compensate the following three sorts of expected change: (1) to be increased up to a level that prevents the household from sacrificing a portion of its budget allocated for nonfood items to compensate, partially the expected decrease in their food bill at free price levels; (2) to induce a real increase in the household income at least equal to, or preferable above, the expected inflation in food prices (15% a year); and finally (3) to induce a significant increase in poor households budget to enable them to raise their food consumption level quantity-wise and quality-wise up to the healthy level as a measure of the human welfare. To achieve only the first two income substitution effect components, the annual economic growth should be 9%, which is not practically possible on short or even on medium run, because it needs at least 36% of the national income, (GDP) as net investment (6).

### ***FUTURE PROGRAMS TO MANAGE MALNUTRITION***

The study classified the proposed programs, under free market conditions, as long run and short run programs. The later are target oriented programs that focuses upon certain population categories or communities.

#### ***Long Run Strategy***

If agriculturalists are encouraged by nutritionists and planners to believe that populations can subsist on cereal diets, there will continue to be a lag in production or development of better sources of protein, and the diets of the poor will deteriorate further.

Cereal diets are marginal in their protein value relative to both their bulk and caloric density. They are, also, marginal in their energy ratio relative to their bulk. In addition, it is useless to suggest that a child can get sufficient protein and calories from a cereal diet if he/she merely

eats more of it. Young children often do not have the capacity to digest the large quantities of some cereal diets that would be necessary to satisfy their full nutrient requirements.

If, and only if the cereals have stayed as the major food sources, the desirability of genetic improvement in the protein characteristics of cereals and other staple food crops is vitally needed.

Another consequence of the lack of concern for maintaining a proportionate availability of legumes, oil-seeds, or animal protein products, has been the loss of foods of greater caloric density than contained in cereals. Oil-seeds, in particular, such as soybean, are not only good sources of protein but, as their name indicates are also of fats and oils, which are the most concentrated sources of food energy.

It is apparent that with the continuing rapid increase in population and reluctant economic growth, it will be far easier and cheaper to provide the basic staple, whatever it is, a cereal or starchy root, than it will be to provide the legumes, oil-seed or animal protein supplements needed by major vulnerable segments of the population. These segments include infants, young children, pregnant and lactating women and persons exposed to the stress of infections or other poor environmental conditions.

#### ***Proposed Target-Oriented Programs***

Although the study identified the poverty line to be within the average per capita income of less than L.E. 699 per year in rural (44% of the rural population) and those households of less than L.E. 670 per capita per year (6% of the urban population), both conventional credit policies, either the food price subsidy or direct monetary subsidy of income of poor households have shown little benefit with much social costs, for many reasons beyond the scope of this paper, but discussed in earlier research work ( 5 & 6)

Therefore, the theme of the government role should, in general, be the implementation of some specified target-oriented nutritional programs, during the transitory period of the developing economy from central planned to free market, from poverty to prosperity. These programs are "Crash-Programs" aiming at securing the adequate diet, quality and quantity wise for the vulnerable groups. These programs need cooperative, consistent and empirical efforts among several society institutions (Nutritionists, Social scientists, Economists, Ministries of health, Agriculture, Supply and internal trade and ministries of social affairs). The components of the program can be viewed as: (1) School Lunch Programs; (2) Enriched Bread Program (supplement of iron or even a mix of wheat and corn to reach the complementary effect between essential amino acids); (3) Food Stamp Program; 4) Soybean preparation meals

#### ***Nutrition Extension Advocacy***

Dissemination of nutrition and health information through mass media, especially radio and television, which are available now in almost all houses either in urban or rural, is an important mean to create and promote better nutrition awareness and behavior of the whole population. Promotion of appropriate low cost foods, particularly weaning foods prepared from food items available at household, would be of great help to the poor.

On the other hand, the study showed that among rich households, a significant proportion of both urban and rural population receive over food intake, much above the healthy requirements, which is also a case of malnutrition. Therefore, rationalization of the food consumption of sugar, oils and bread among such rich household can be addressed to the family members, particularly women or generally the wives. Leaving such food consumption above requirements, without rationalization, leads to several diseases. Among those diseases are obesity, diabetes and other nutritional disorders.

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**Table 1 Daily par capita Dietary pattern By Demographic Region in 1991**

Food item	URBAN		RURAL		NATIONAL AVERAGE	
	Kcal	%	Kcal	%	Kcal	%
Energy: intake						
Wheat	1147	50.6	901	41.3	1032	46.2
Rice	191	8.4	303	13.9	244	11.0
Corn	12	0.5	213	9.8	106	4.8
Legumes	75	3.3	99	4.5	86	3.9
Vegetables.& Fruits	185	8.2	141	6.4	165	7.3
Sugar	236	10.2	197	9.0	218	9.8
Fats and Oils	234	10.3	206	9.4	221	9.9
Animal products	189	8.3	123	5.6	158	7.1
Total	2269	100.0	2183	100.0	2230	100.0
protein	Gram	%	Gram	%	Gram	%
Plant	55.3	77.9	52.0	82.4	53.7	79.9
Animal	15.7	22.1	11.1	17.6	13.5	20.1
Total	71.0	100.0	63.1	100.0	67.2	100.0

**Table 2: Dietary Pattern By income Classes in Urban and Rural Regions**

Region	Urban			Rural		
Income class *	Low	Moderate	High	low	Moderate	High
Population (%)	15.78	43.11	41.11	27.02	43.64	29.34
<b>Energy pattern (percent of total intake)</b>						
Cereals	63.5	62.8	52.4	67.3	64.2	59.3
Legumes	2.6	3.7	3.9	4.0	4.5	4.4
Vegetables & Fruit	7.5	7.9	11.5	6.3	7.6	8.8
Oils	10.7	8.1	7.3	7.5	7.0	7.5
Fats	0.7	1.1	1.9	1.8	2.0	2.7
Sugar	9.6	9.2	12.2	8.6	9.1	10.2
Animal products	5.4	7.2	10.8	4.5	5.6	7.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
<b>Protein Pattern (percent of total intake)</b>						
Cereals	72.2	68.3	57.0	69.5	65.4	59.4
Legumes	6.8	6.6	7.3	12.1	11.7	11.8
Vegetables.& Fruits	5.0	5.6	7.1	4.4	5.4	6.0
Animal products	16.0	19.5	28.6	14.0	17.5	22.8
Total	100.0	100.0	100.0	100.0	100.0	100.0

\* Income class in LE/ Household/ Yr. Low level denotes 3200: Moderate level denotes 3200- 6800. High level denotes. 6800.

**Table 3 Comparison between Average Daily Nutritional in Egypt over Two Decades.**

Energy	1974/ 75(1)		1990/ 91	
	Kcal	%	Kcal	%
Cereals	2052	75.2	1382	62.0
Legumes	67	2.8	86	3.9
Vegetables Fruits	69	2.5	164	7.3
Sugar	151	5.5	218	9.8
Oil	255	9.4	221	9.9
Animal prod	125	4.6	158	7.1
Total	2728	100.0	2230	100.0
Protein	(gm)	%	(gm)	%
Plant protein	64.7	85.5	53.7	79.9
Animal protein	11.0	14.5	13.5	20.1
Total	75.7	100.0	67.2	100.0

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**Table 4 Dietary Adequacy in Rural and urban Regions by Income Class in 1990/ 1991**

Household expend class (L.E./yr) by Region	Average per capita expenditure. (L. E/Yr)	Food expenditure. (% of total expenditure)	Cumulative population (%)	Energy (kcal/Capita /day)			Protein ( g/Capita/day )		
	( L.E./yr )			Intake	Requirements	Adequacy (%)	Intake	Requirements	Adequacy (%)
Urban Region									
1200	502.5	65.7	0.5	1855	2286	81	55.9	78.6	71
<2400- 1200	558.6	60.2	5.5	1918	2256	85	58.2	69.9	83
2400- <4000	670.6	57.6	3.2	2055	2216	93	62.7	68.0	92
400-<5600	852.4	55.1	58.9	2320	2281	102	71.8	68.5	105
5600- <8000	1106.4	51.7	81.8	2403	2323	103	75.1	70.2	107
8000- <12000	1575.6	46.4	94.4	2747	2351	117	84.5	71.5	118
12000+	961.92	35.5	1	3209	2370	135	96.0	72.0	133
Average	1058.5	49.9	-	2269	2295	99	71.0	69.4	102
Rural Region									
<1200	178.5	68.5	1.80	76.1	2174	35	23.2	62.3	37
1200- <2400	321.3	64.6	12.7	1313	2140	61	39.5	64.3	61
2400<4000	512.1	62.8	43.7	1892	2159	87	54.3	65.3	83
4000<5600	699.2	61.1	70.7	2319	2169	107	65.9	65.4	101
5600<8000	910.5	58.6	90.0	2632	2192	120	75.8	67.0	113
8000- <12000	1076.2	63.0	97.2	3099	2222	140	88.4	65.7	135
12000+	1883.4	48.5	100.0	3665	2287	160	103.2	68.1	152
Average	703.4	59.5		2183	2173	101	63.1	65.4	96

**Table 5 Average Values of the Socio economic Factors Affecting food consumption**

Region	Urban Average	Rural Average
Household Expenditure (L E./ Yr)	1058	703
% of Expenditure on Food	49.9	59.4
Household Size (Person)	5.22	6.55
% of Children 10 yr	23.5	30
No. of Income Earners (person)	1.7	1.6
Protein Price (PT/g)	204.4	180.8
Energy Price (PT/ Kcal)	6.38	5.23

**Table No. 6. Economic Growth Rate in Urban and Rural**

comparison	Annual per capita expenditure. L. E.		Annual Growth rate
	1974/75	1990/91	74/75- 90/91
<b>Rural Region</b>			
Nominal value	34.34	703.37	20.77%
Real value	23.93	54.05	5.22%
<b>Urban Region</b>			
Nominal value	102.51	1058.49	15.71%
Real value	71.44	81.34	0.81%
<b>National Average</b>			
Nominal value	80.34	863.18	16.00%
Real value	55.99	66.33	1.07%
CPI (66/67 price level = 100)	128	1192	14.97%

**Table No 7 Income Distribution Pattern over Two Decades.**

Rural Cumulative Distribution (%) of:				Urban Cumulative Distribution (%) of:			
1990 / 1991		1974 / 1975		1990 / 1991		1974 / 1975	
population	income	population	income	population	income	population	income
0	0	0	0	0	0	0	0
1.14	0.22	1.5	0.16	0.29	0.12	0.4	0.03
1.81	0.45	3.8	0.52	0.45	0.20	1.11	0.11
3.98	1.20	6.53	1.22	1.14	0.60	2.07	0.26
12.68	5.30	14.28	3.96	5.54	2.83	3.32	0.83
27.02	14.51	25.37	9.3	15.78	8.71	10.49	2.42
43.68	27.45	37.98	17.17	30.17	18.13	17.65	3.32
59.02	41.59	50.2	28.42	46.08	29.91	26.23	9.57
70.66	53.86	69.54	44.84	58.89	40.87	34.81	14.6
82.39	67.91	87.32	67.47	72.51	54.03	58.01	32.22
89.96	78.64	94.08	80.16	81.77	64.55	82.55	59.83
94.92	87.02	96	87.01	90.42	76.67	89.16	70.47
97.22	91.54	98.87	93.44	94.43	83.51	93.69	84.04
98.20	94.07	99.53	96.32	96.46	87.83	98.52	92.43
100.0	100.00	100	100	100	100.00	100	100

**Table No. 8 Indicators of income Distribution Equality in Both Rural and Urban**

<i>Income Equality Parameter</i>	<i>Egyptian Rural</i>		<i>Egyptian Urban</i>	
	1990 / 1991	1974 / 1975	1990 / 1991	1974 / 1975
Coefficient of Equality	75.15%	65.53%	74.58%	64.31%
Coefficient of inequality	24.85%	34.47%	25.42%	35.69%